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At left, gunners prepare to remotely fire the Avenger air defense system from a foxhole at the Joint Readiness Training Center, Fort Polk, La. At right, a Ground-based Midcourse System booster rocket streaks skyward from the Ronald Reagan Ballistic Missile Defense Test Site on Kwajalein Atoll.

From Foxhole to Homeland

Evolving Theater Missile Defense and National Missile Defense into the Ballistic Missile Defense System

by Lieutenant General Joseph M. Cosumano Jr.

Unlike the Cold War, today's most urgent threat stems not from thousands of ballistic missiles in Soviet hands, but from a small number of missiles in the hands of states for whom terror and blackmail are a way of life. They seek weapons of mass destruction to intimidate their neighbors and to keep the United States and other responsible nations from helping allies and friends in strategic parts of the world . . . To maintain peace, to protect our own citizens and our allies and friends, we must seek security based on more than the grim premise that we can destroy those who seek to destroy us. - President George W. Bush at the National Defense University, May 2001

In the past the Army made programmatic and acquisition distinctions between Theater Missile Defense (TMD) and National Missile Defense (NMD) systems. TMD focused on defense against short- and medium-range theater ballistic missiles (TBM), cruise missiles (CM), and air-to-surface missiles whose targets are within a particular theater of operation. NMD was designed as a limited capability to engage a small number of intercontinental ballistic missiles (ICBMs) targeting United States territory. Both were stove-piped mission areas addressing specific classes of threat missiles. What was TMD to us, however, some overseas allies considered NMD in their circumstances. And many outside of the United States, friends and potential adversaries, perceived NMD to be a unilateral effort to create a "Fortress America."

The passing of the Soviet Union and the emergence of new threats changed the geostrategic environment, blurring the lines between strategic and tactical operations and objectives. President Bush has made it clear our goal is a comprehensive missile defense capability that will protect our nation, our deployed forces, and our allies and friends. Additionally, the commonalities among the technologies used to combat the differing missile threats become more evident as system development efforts progress. Therefore, the distinctions between TMD and NMD are more artificial and less relevant than in the past. Today we talk in terms of a joint Integrated Missile Defense (IMD) architecture that will extend protection against missile attack "from the foxhole to the homeland." The emerging Ballistic Missile Defense System (BMDS) will provide IMD's active missile defense elements. This article examines the reasons for these changes and the implications for the Army.

The Growing Threat

Each year the Senate Select Committee on Intelligence receives a report on Foreign Missile Developments and Ballistic Missile Threat, commonly known as the National Intelligence Estimate. It documents our intelligence agencies' best judgment on trends in emerging threats to United States

national security interests. This year's report makes it clear the proliferation of missile technologies continues at an alarming rate, meaning we cannot ignore the possibility of their future use.

For decades, the nuclear-tipped intercontinental ballistic missile (ICBM) threat to the United States was effectively countered by the doctrine of Mutually Assured Destruction (MAD). The new National Intelligence Estimate postulates that, along with Russia and China, North Korea and Iran (and possibly Iraq) will likely become ICBM capable by 2015. With the advent of these and similar new threats, including international terrorism, it is not at all certain MAD will protect the United States from missile attacks launched by rogue regimes or non-state actors with less regard for the possible consequences of such attack.

A number of other countries also have, are developing, or are attempting to buy ballistic missiles, cruise missiles and large caliber rockets, with plans to launch them from a variety of mobile platforms and fixed locations. These primarily threaten our deployed forces, allies, and friends, but can also strike the United States if placed on forward-deployed or mobile platforms.

The availability of rockets and cruise and ballistic missiles of all types and the demonstrated willingness of potential adversaries to use them create an environment where threats to the homeland could occur concurrently with hostile activity in one or more overseas theaters. We will need regional missile defenses to counter many of the same threats considered today as "national" threats. Theater commanders may face simultaneous attacks from rockets, TBMs, intermediate range ballistic missiles, ICBMs and cruise missiles, possibly launched from outside the area of operations. Multiple commanders-in-chiefs will be involved in the negation of these threats, including some in the United States. In this environment, coupled with the promise of multi-use technologies, the overlap of NMD and TMD makes continued stovepiping irrelevant.

Technology Commonalities

Many of the capabilities designed for TMD are just as applicable to NMD, and vice versa. For example, we currently rely on Defense Support Program satellites for initial detection of missile launches worldwide. Detection has never been—and cannot be—the purview of one system for one range of missiles and another system for another range of missiles. Similarly, we are developing radars with the ability to track missiles launched and intended to impact within a single theater of operations and from one theater to another. The Theater High Altitude Area Defense (THAAD) radar is a good example. Today, we can employ the same sensors and many of the same weapon systems to detect and then counter an enemy's ability to launch missile attacks. Though terminal and mid-course defenses may require differing technologies due to the speeds and ranges involved, we should employ boost phase intercept systems against any type of missile if they have a chance at intercepting it, regardless of range. And finally, the battle management, command, control, communications, computers and intelligence (BMC4I) systems are intertwined through the Global Information Grid and their common functions.

The recognition of how the world is changing is nowhere more apparent than in two recent events. President Bush's December 2001 announcement that the United States will withdraw from the ABM Treaty reflects his intent to move ahead with the development and deployment of a missile defense capable of protecting all 50 states, and also to do

Soon after the September 11 terrorist attacks, U.S. President George Bush announced America's withdrawal from the Antiballistic Missile Treaty, which had long stymied efforts to develop and deploy antiballistic missile systems to protect the United States from long-range ballistic missile attack.

away with treaty-imposed artificial barriers between theater and strategic system technologies that have only hindered the development of effective missile defenses. The secretary of defense's January 2002 reorganization of the Ballistic Missile Defense Organization (BMDO) as the Missile Defense Agency (MDA) brings together the many disparate ballistic missile defense efforts into one program to develop a single integrated Ballistic Missile Defense System (BMDS). The BMDS, with ground, air, sea, and space-based elements, will defend the United States, military forces overseas, allies and friends by employing layered active defenses to intercept missiles of all ranges in all phases of their flight (boost, midcourse, and terminal).

As multi-capable technologies and systems emerge that are able to achieve effects across a range of missile flight phases, missions, and areas of responsibility, the need for this integrated view of missile defense from the foxhole to the homeland becomes obvious.

Integrated Missile Defense (IMD) Concept

As noted, the continued differentiation between TMD and NMD for all intents and purposes is meaningless. We are now talking in terms of Integrated Missile Defense — a comprehensive family of capabilities effective against all types of missile threats directed anywhere from the foxhole to the U.S. homeland. The four recognized operational elements of TMD—active defense, passive defense, attack operations, and BMC4I—remain relevant in the IMD construct.

IMD **Active Defenses** will protect population centers, military forces, infrastructure and key assets through direct engagement and negation of missiles in flight. In defense of American territory, they will protect American lives and ensure a potential adversary cannot deny the U.S. its power-generation capability. Regionally they will defeat enemy anti-access strategies and protect deploying and deployed forces, friends, and allies. Multi-layered active defenses will engage a missile as early as possible in its flight path, regardless of its range or origin. The key to successful active defense is to engage early and as often as necessary to negate each threatening target.

Successful passive defense depends on battlespace situational awareness through effective global BMC4I. That, and rapid warning of missile attack, are two key components of IMD **Passive Defense**. Passive Defenses mitigate the loss of combat power or degradation of mission capability due to attack. Nationally, effective warning will enable the president and secretary of defense to prepare civilian population centers and local authorities before a chemical, biological, radiological or nuclear attack. Regionally, they will warn directly threatened units of possible attack, alert others to continue operations in a vigilant but unencumbered posture, and extend warnings to friends and allies.

The preferred method for countering enemy missile threats is through preemptive ***Attack Operations***. Attack Operations include all actions taken to disrupt and destroy an enemy's ability to launch and/or control a missile attack. At the strategic level, attack operations may focus on our adversaries' ICBM delivery means and associated support structure, and their ability to launch shorter-range missiles at the U.S. from forward-deployed platforms. At the regional level, they will focus on in-theater and out-of-theater launch points and support infrastructure. In both cases, we will employ common sources of intelligence, common BMC4I, and perhaps even common attack assets. The key to effective attack operations is reducing the detect-to-engage timeline. Until we achieve a single-digit response time, reacting to attacks and searching for mobile, time-sensitive targets will remain the most difficult part of the IMD mission.

BMC4I is the primary enabler of a robust IMD. It is the "glue" holding the whole process together. BMC4I must fully integrate passive and active defenses and attack operations to provide timely threat assessment and rapid tactical warning, mission assignment, targeting, and post-strike assessment. Within the operational architecture, it encompasses the functions of planning, execution, and battle management, in an environment increasingly reliant on computers and integrated intelligence, surveillance, and reconnaissance. The goal of BMC4I is to provide the right information to the warfighter (whether back in the United States or deployed) in time to enable effective warfighting decisions. Successful BMC4I will depend on the careful integration of legacy systems with new technologies in a seamless, global environment.

The Army's role in IMD will be to: (1) provide the ground-based active defense elements of the overall IMD architecture; (2) contribute Army assets to joint attack operations missions; (3) ensure Army forces take necessary measures to protect themselves from the effects of a missile attack and ensure early warning is disseminated in a timely fashion to affected Army forces; and (4) seamlessly integrate Army BMC4I capabilities into the IMD architecture.

The IMD concept stresses capability evolution rooted in the principles of unity of effort, unity of command, centralized planning and decentralized execution. Insights derived from recent wargaming and analysis lead us to believe the most important factors in the integration process, in descending priority order, are:

- A joint, collaborative, continuous, dynamic planning process addressing all elements of missile defense, embedded in the Army Battle Command System, and contributing to network-centric rapid decisive operations.

- Continued intelligence, surveillance and reconnaissance integration, derived from all sources (multi-intelligence, multi-spectral, sensor-fused), able to focus on missile warfare, providing common understanding, thus enabling coherent response.

- Augmented sensor coverage to increase event cueing and enable employment flexibility.

- Computer network defense operations, focused on hardware, data and software integrity and assurance to prevent denial of service and malicious insider attacks.

- Joint full spectrum attack operations to reduce ballistic and cruise missile threats, preferably prior to launch, as well as counter-reconnaissance, surveillance and target acquisi-

The Patriot Advanced Capability-3 missile will greathly enhance the effectiveness of the Patriot PAC-2 air and missile defense system, shown above during the 1991 Gulf War victory parade in Washington, D.C.

tion (RSTA) operations against unmanned aerial vehicles (UAVs).

- Advancements in defensive system development to keep pace with offensive and countermeasures technologies and proliferation.

The Army's Role in BMDS

BMDS represents the active defense element of the joint IMD. It will include the U.S. Air Force's Airborne Laser, Navy sea-based systems, land, sea and space-based sensors, and Army interceptors including THAAD, Patriot, the Medium Extended Air Defense System (MEADS) and the Ground-based Midcourse Defense (GMD) System, formerly called NMD. Program funding and management are provided by MDA, and the BMDS Program Executive Officer reports to the MDA director.

As the lead service (less acquisition), the Army will field, operate and sustain the GMD. U.S. Army Space and Missile Defense Command (SMDC) is the GMD combat developer, responsible for identifying, coordinating and documenting the Army's doctrinal, training, leader development, organizational, materiel and soldier (DTLOMS) requirements for the GMD. SMDC also provides the test range assets, including the Ronald Reagan Ballistic Missile Defense Test Site on Kwajalein Atoll, and is working closely with the Army Corps of Engineers on deployment planning and preparation of future sites for GMD, including Fort Greely, Alaska. In keeping with its traditional mission of Homeland Defense, units of the Army National Guard from many states will operate the system under the command and control of the Commander in Chief, North American Aerospace Defense Command (NORAD).

Future Technological and Organizational Challenges

The U.S. and the Army must continue to identify, develop, and test promising technologies that will reduce size, weight, signature and power consumption, and improve the processing, range, speed, and lethality of its future family of BMDS systems. We also need to advance kinetic- and directed-energy technologies for optical, acoustical, infrared, radar and ladar seekers. We must continue to support sensor technology development in acoustic and hyperspectral information, and SAR/IFSAR (synthetic aperture-, and interferometric synthetic aperture-radar). We need to improve energy storage, solid-state and chemical lasers, and develop more precise target and aim point selection algorithms. We must also achieve faster and greater throughput from computers, communications devices, and common automated battle planning and decision management tools, such as developing a global Family of Interoperable Integrated Air, Ground, Maritime and Space pictures.

Active Defense: Eleven years after we first called upon Army Patriot units to protect U.S. and Allied forces, and Saudi and Israeli populations from Iraqi Scud missiles, we are deploying the first new element of BMDS, the Patriot Advanced Capability-3 (PAC-3). We have fielded the PAC-3 ground systems to several Patriot battalions and are in the process of fielding the others, and the first missiles were delivered to the Army in September 2001. From January to May 2002, the Army's independent test and evaluation office will conduct operational tests of the system, after which the Army leadership will decide whether or not to move into full rate production.

Over the course of the next 10-15 years, we expect to see several other new active defense elements of BMDS enter

The Army expects to field the Theater High-Altitude Area Defense System in 2007 or 2008. Meanwhile, the system is undergoing rigorous testing.

the force. In addition to PAC-3 and GMD, Army forces will operate the Surface-Launched Advanced Medium-Range Air-to-Air Missile (SLAMRAAM), THAAD system and MEADS. The Navy will continue to develop a sea-based midcourse defense (formerly known as Navy Theater Wide) and an Aegis-based complement to the PAC-3. The Air Force will deploy and operate the Airborne Laser, and demonstrate a Space Based Laser capability. These active defense systems will provide the multi-layered defense necessary to counter in-flight missiles of all ranges.

We will very likely see a directed-energy weapon integrated into the Future Combat System. The success of the Tactical High Energy Laser Advanced Concept Technology Demonstration (ACTD) and initiation of the Advanced Tactical Laser ACTD have brought chemical laser technology out of the laboratory. Our ongoing work with solid-state lasers will provide "leap-ahead" capabilities for the Objective Force.

Passive Defense: Sensor coverage augmentation is critical to enhancing the effectiveness of our passive defenses. Sensors capable of determining the presence of weapons of mass effect, when coupled with greater timeliness and precision in determining their impact areas, will enable more effective warnings and reactions to mitigate the weapons effects. Under the IMD concept, air and missile defense sensors and BMC4I elements, netted with joint and multinational sensors and networks, will ensure a complete visualization of the battlespace. Information will be fused with other friendly information to determine forces or areas that may be affected.

Today, the Joint Tactical Ground Station (JTAGS) provides rapid early warning to deployed headquarters through in-theater downlink and processing of Defense Support Program missile launch detection data. JTAGS computes the estimated launch point and predicted impact area and time to support implementation of timely passive defense measures as well as the cueing of attack operations assets and the BMDS.

Data from the Space-Based Infrared System (SBIRS) constellation of surveillance satellites, successor to Defense Support Program satellites, will be processed through the Multi-Mission Mobile Processor (M3P)—an improved JTAGS. M3P, a joint effort between the Air Force and Army, will provide a significantly better-focused missile warning and de-warning, higher quality cueing of BMDS systems, decreased missile launch search area, and faster initial report times. Other passive defense improvements may allow tailoring of warnings to more localized areas, perhaps using pagers to warn specific units.

Attack Operations: Enhanced attended and unattended ground, air, and space sensors will soon enable us to characterize threats prior to launch. Longer range and greater precision weapons such as the Army Tactical Missile System (ATACMS), armed Predator UAVs and Comanche attack-reconnaissance helicopters coupled with these advanced sensors will provide the greatest improvements in this area, enabling destruction of mobile launchers and other important tactical targets prior to their employment.

The need for persistent, non-intrusive, deep and denied large area coverage of ground moving target indicators will result in the development of a new Space Based Radar. It will provide in-theater, dynamically re-taskable Distributed Common Ground Station compliant data via direct-downlink of digital topographic engineering data. This will improve attack and deep strike operations against ground targets such as mobile missile and rocket launching platforms. Future IMD architectures may even include systems capable of engaging threat space systems. Examples may be tactical ground-based directed-energy systems capable of attacking air platforms, dazzling space sensors (space control), or radio frequency jamming to disrupt command, control, and communications systems.

BMC4I: Interoperable C4I systems, automated battle management decision aids, joint collaborative planners, integrated fire control and consistent situational awareness will enable effective passive and active defense and attack operations. The Army Air and Missile Defense Command (AAMDC) provides rapidly deployable, full-service missile defense command and control capability to link Army forces into the IMD network. SMDC is testing several system upgrades to processors and displays in the Future Operational Capability Tactical Operations Center (FOC TOC) to streamline the "footprint" of the AAMDC and so reduce the airlift requirement. We will continue to work closely with the 32nd AAMDC and the 263nd AAMDC (South Carolina Army National Guard), as well as the U.S. Army Air Defense Artillery School to develop the DTLOMS solutions necessary to the IMD mission.

The Joint Land Attack Cruise Missile Defense Elevated Netted Sensor (JLENS) was recently turned over to the Program Executive Officer for Air and Missile Defense for continued development and acquisition. JLENS is a cost-effective airborne sensor platform for providing over-the-horizon detection, tracking and engagement support for land attack cruise missile defense. The system will enhance detection and engagement ranges of current air defense weapons such as Patriot, the Navy Area Defense system, SLAMRAAM and ultimately MEADS.

Of critical importance to accomplishing the IMD mission is situational awareness. A Single Integrated Air Picture (SIAP) will provide the commander and his or her air and missile defense forces with a common, continuous and unambiguous track for every aerial object of interest in the battlespace.

Active defense benefits will include faster and more effective response to air, cruise missile and ballistic missile attacks with reduced fratricide of friendly aircraft. And SIAP, as part of the larger Family of Interoperable Pictures, will also assist in developing timely warning of air or missile attack for threatened units, and support attack operations against missile points of origin. SMDC is working closely with the Joint Theater Air and Missile Defense Organization and the Missile Defense Agency's SIAP System Engineer Task Force to define and coordinate the Army's IMD interoperability requirements and technical solutions.

As our future missile defense systems mature, and as we effectively integrate them within the joint and allied community, so too our organizations must evolve. Recent efforts to streamline Army and major command headquarters, and recognition of the need for a new unified command to protect our homeland, all while fulfilling our continuing global commitments to allies and friends, will pose a number of issues we must aggressively address. How far can we stretch the Army air and missile defense units, personnel and equipment? Can we strike the correct balance and make the correct tradeoffs in organizational and technological investments? What doctrinal changes will be needed to most effectively use our new or upgraded capabilities?

Conclusion

In the changing strategic environment, the Army has already done a great deal to successfully meet the evolving threat with continuous improvement and technical advancement in missile defenses. A joint Integrated Missile Defense "from the foxhole to the homeland" is one means through which our collective vigilance and common joint vision will overcome these threats. The Army's current and future contributions to IMD, including Attack Operations, Passive Defense and BMC4I capabilities, and the ground based elements of Active Defense, will ensure we remain the best fighting force in the world.

Secure the high ground!

Lieutenant General Joseph M. Cosumano Jr. assumed command of the U.S. Army Space and Missile Defense Command and the U.S. Army Space Command on April 30, 2001.

What the Future Holds for Air and Missile Defense Soldiers

by Lieutenant Colonel Barry G. Halverson

What does the future hold for Air and Missile Defense (AMD) soldiers?

Better promotions, assignment diversity, job satisfaction, and better leadership. Army, Training and Doctrine Command (TRADOC), and Air and Missile Defense (AMD) transformation—within both the institutional and operational Army—are in full swing and will impact the soldiers in our branch. Over the past 12 months the soldiers and civilians of the Office, Chief of Air Defense Artillery (OCADA), have worked hard with personnel from every U.S. Army Air Defense Artillery School directorate, TRADOC, Personnel Command (PERSCOM), the Army G1, and the Air Defense Command Group. Our mission was to determine the best personnel courses of action to accomplish established transformation objectives while simultaneously addressing soldier concerns that cause soldiers to leave the Army and Air Defense Artillery.

To put things in perspective, we will first review the health of the branch today, then discuss the changes brought about by transformation that impact the overall air and missile defense force, followed by those changes that effect each segment of our force (enlisted soldier, warrant officer, and officer). Everything discussed in this article is applicable to both the active and Army National Guard air defense forces and has been approved for implementation, unless specifically stated otherwise.

What is the current health of the Air and Missile Defense force?

Enlisted. You can see from Figure 1 our enlisted force has gone from 97 percent aggregate strength last year to 100 percent this year. By the beginning of the first quarter of fiscal year 2003 all of our military occupational specialties (MOSs) will be at or above 100 percent strength..

This will be the first time in more than five years this has happened. Except for those in school or in transit from one duty station to another all of our units should have their

The future holds better promotions, more assignment diversity and greater job stisfaction for Air and Missile Defense soldiers.

MOS	CMF 14 INVENTORY			
	AUTHS	ON-HAND	%	EFY 02 (proj)
14E	1016	960	94	97%
14J	987	941	95	*101%
14R	1106	1092	99	96%
14S	2519	2491	99	100%
14T	1991	2100	106	105%
14Z	281	304	108	100%

Figure 1. ADA Enlisted Force Strength

respective air defense MOSs filled to nearly 100 percent. While accessions are exceeding expectations, enlisted retention could be better. We are doing better than the past two years, but with our ETS-eligible population growing in FY 03, we need to do better. All commanders, command sergeants major, and first sergeants need to get involved to keep our best and brightest. Department of the Army (DA) enlisted promotions for sergeants first class and above this past year were the best they have been in more than five years. Sergeant first class promotions were 26 percent while the Army average was 21 percent. Master sergeant promotions were 18 percent while the Army average was 12 percent. Sergeant major promotions were 21 percent while the Army average was 12 percent. Selections and attendance at the Primary Leadership Development Course, Basic Noncommissioned Officers Course, Advanced Noncommissioned Officers Course, and the United States Army Sergeants Major Academy were equally as good.

Warrant Officers. Our Warrant Officer Corps is filled to above 100 percent strength (see figure 2). Promotions have been slow because of a grade imbalance (we have more CW4s authorized than CW3s), and we have not had the authorizations for the number of senior warrant officers we need to maintain steady promotion rates. AMD transformation will change that.

Officers. Officer accessions were a problem from 1992-1996 and 1998-2000; however, in 2001 we accessed 214 lieutenants (we need 215 a year to fill our lieutenant and captain authorizations), and in 2002 we are on track to access between 220 and 225. Figure 3 shows the health of our Officer Corps by year group.

The dotted line above the year groups indicates the numbers needed to fill authorized positions. You can clearly see the difference in the year groups mentioned above.

The good news is we are getting better. Although year group 1999 was a particularly bad year for accessions (we accessed only 130 and received 79 branch details), the Army gave us authorization to retain 39 of the 79 branch detailed officers, if they volunteered. We screened the records of these 79 officers and asked 39 of them to stay in Air Defense Artillery; 20 volunteered to stay. We also sent letters to Individual Ready Reserve officers, asking them to return to active duty. Twenty-three have already returned and 29 more are considering the opportunity. Your branch is not waiting around for people to magically appear and fill our vacancies—we are taking action to remedy our shortages. While accessions are improving, our attrition rate is a concern that requires the efforts of all leaders to fix.

What changes are going to occur that will impact the Air and Missile Defense soldier overall?

Air and Missile Defense sensor, command, control, communications, computer and intelligence (C4I), and launch platforms are being upgraded or new platforms engineered to meet the capabilities required by the objective force. These platforms will have more functional commonality, will be lighter, and will have extended surveillance and engagement ranges with enhanced lethality. These characteristics support Army transformation requirements and the way the Army plans to fight future battles—with smaller, lighter, more lethal organizations. These new and exciting warfighting concepts will affect AMD doctrine, training, leader development, organizations, materiel, and our soldiers, including their MOSs.

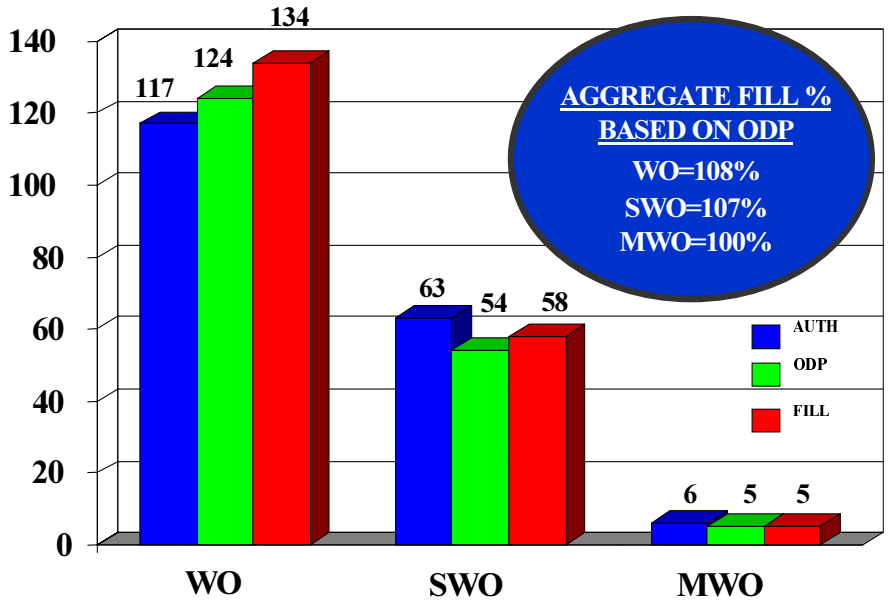


Figure. 2 ADA Warrant Officer

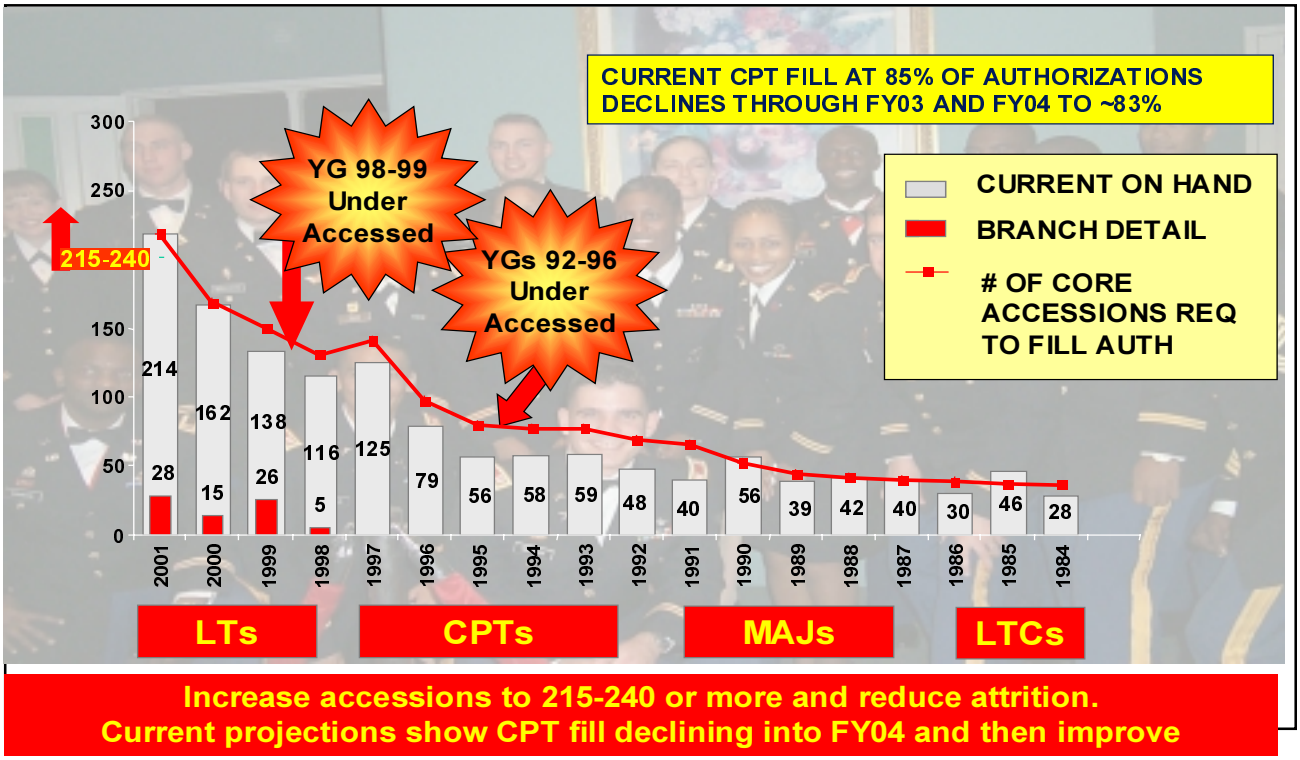


Figure 3. ADA Officer Accessons

From a soldiers perspective, what changes in Air and Missile Defense transformation will effect me?

Enlisted. We reviewed the tasks associated with current air and missile defense platforms and their commonality (there is as much commonality between the tasks associated with operating and maintaining a Sentinel radar as there is with a Patriot radar). We then looked at future platforms with their increasing commonality. Future platforms considered included a common launcher for the Theater High Altitude Air Defense (THAAD) system and Patriot, and an Air and Missile Defense Planning and Control Station (AMDPCS) for all C4I operations. These will replace the Forward Area Air Defense Command and Control system, Air Defense Management Operations Center, Patriot Battery Command Post, and Patriot Tactical Control Station, which we have today. We also took into account the move toward a better, more common radar.

It became obvious that instead of aligning our MOSs by echelon, as we do today, we should align them by task and function. For example, 14E (Patriot Fire Control Enhanced Operator/Maintainer) and 14T (Patriot Launching Station Enhanced Operator/Maintainer) are currently associated with echelons above division while 14R (Bradley Linebacker Crewmember) and 14S (Avenger Crewmember) are associated with division and below. We need to align them by task and function. By doing this, we eliminate some of the duplication of tasks between our MOSs; thereby simplifying duties and responsibilities. 14E soldiers will eventually give up responsibility for engagement operations to 14J (Air Defense C4 Tactical Operations Center Operator/Maintainer) soldiers and 14E soldiers will assume responsibility for all radar operations and maintenance tasks, to include those currently performed by 14J soldiers. 14T soldiers will assume responsibility for all launch platform operations, which will include the THAAD/Patriot launcher, Medium Enhanced Air Defense System launcher, and Surface-Launched Advanced Medium Range Air-to-Air Missile (SLAMRAAM) system.

Soldiers with 14M MOS will transition to 14S or 14T. Soldiers with 14R MOS will continue to be our branch's maneuver element. 14S soldiers will be allowed to transition into either 14R or 14T MOSs as we phase out Avenger and bring on SLAMRAAM. Aligning MOSs by task provided an opportunity to focus the training of our soldiers on those tasks they need to know for their first unit of assignment. This reduced the associated tasks they need to learn, ensuring a higher level of proficiency on those taught—which results in better job satisfaction. Soldiers who reenlist or are reassigned to another unit with different platforms prior to the end of their first enlistment will be sent back to school to acquire the skills they need for their next assignment. This concept is called Assignment Oriented Training (AOT). This has the added benefit of reducing Individual Entry Training (IET) course lengths, which gets the soldier to units sooner, with the right skills.

In the past we trained our soldiers during IET on all aspects of their MOS, knowing that during their first unit of assignment they might only utilize 50 percent of those skills. Then they would make a permanent change of station, or PCS, move to their next unit of assignment, where they would be expected to perform tasks they may not have used in several years. This created readiness concerns, unnecessarily stressed our soldiers, and adversely affected job satisfac-

tion. We predict that reduced IET course lengths will have the added benefit of reducing attrition rates, which correlates to more soldiers in the force. Figure 4 shows graphically how our MOSs will be realigned and what AOT will be offered for each.

Warrant Officers. With Army transformation came Chief of Staff Army (CSA) guidance to bring all warrant officer MOSs in line with the Total Warrant Officer Study. This study redefined what a warrant officer does and added tactical knowledge to their list of responsibilities. Our 140A (C2 Systems Integration Technician) warrant officer job description and duties included both technical and tactical responsibilities; however, our 140E (Patriot System Technician) did not. As you recall from the beginning of this article, our warrant officer grade structure has produced promotion problems. We restructured our current warrant officer positions and submitted our plan to DA on Feb. 20 for implementation.

This will help, but will not solve our warrant officer grade structure problem. To solve it we need to expand our warrant officer population. In today's resource-constrained environment adding positions without "bill payers" (finding an existing table of organizations and equipment position to trade for another) is not an option. A review of these issues in conjunction with job satisfaction concerns among our Patriot lieutenants led us to the following solutions:

· Replace one 14E Assistant Fire Control Platoon Leader position in each Patriot battery with one 140E CW2 (total of 50).

· Replace two of the four 14A Tactical Director positions in each Patriot battalion fire control section with two 140E CW3's (total of 20).

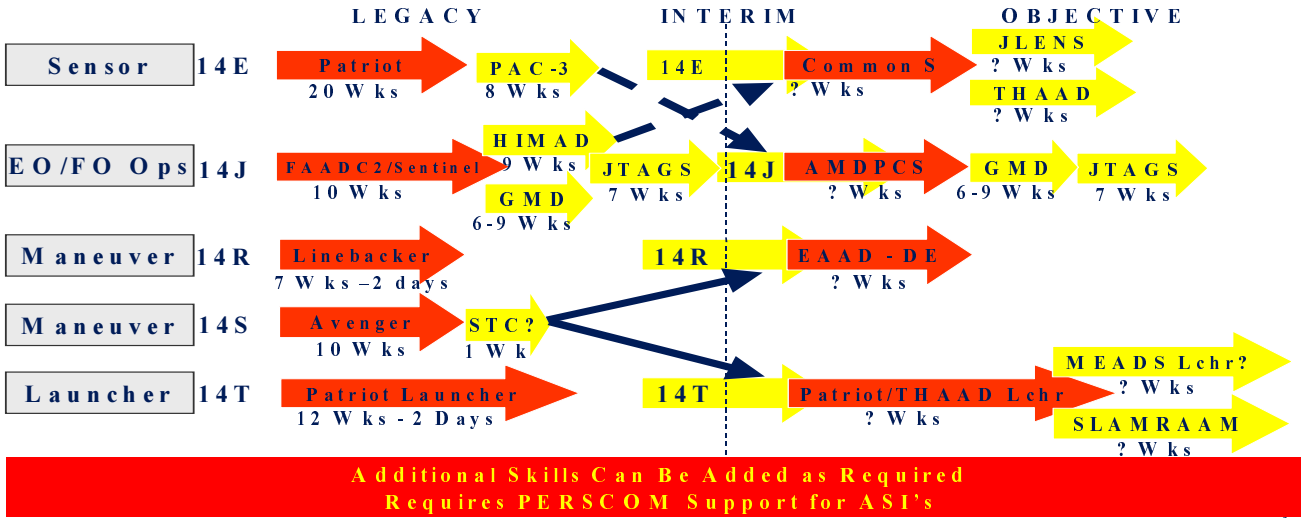
· Move the CW4 from Support Operations Section to one of the three 14A Tactical Director positions in each Patriot brigade fire control section (total of 5) and add one CW5 to each Patriot brigade Support Operations Section (total of five).

These adjustments grow the 140E AMD Warrant Officer Corps by 75 and provide a good pyramid for promotion while simultaneously deleting a non-leader position for a lieutenant. As a second and third order benefit, these personnel realignments meet CSA guidance and improve unit readiness at all echelons (warrant officers provide greater continuity because they remain in the positions longer with repetitive assignments at all echelons).

To provide time to recruit, train, and grow the number of warrant officers we need, without breaking our Noncommissioned Officer Corps, these changes will occur over five years, beginning in fiscal year 2003. MOSs 14E, J, T, and 27X will be the feeder MOSs. A force design update has been submitted to DA that adds one 140A to each Patriot battalion headquarters and one to the ADA battalion of the 82nd Airborne Division. Each Interim Brigade Combat Team and Interim Division will have one 140A assigned to their Air Defense Airspace Management (ADAM) section, a total of 10 to 11 positions. Future system (THAAD, JLENS, and SLAMRAAM) units will have both 140A and 140Es. These increases to force structure expand the base and improve promotion opportunities for ADA warrant officers and ADA NCOs willing to make the transition to warrant officer. Filling and sustaining the required warrant officers positions will require a dedicated recruiting and retention effort on the part of all air and missile defense commanders. As a side effect, the migration of high-quality ADA NCOs to the ADA Warrant Officer Corps will provide increased promotion opportunities for NCOs who do not make the transition.

Officers. Not unlike our enlisted soldiers and warrant officers, our officers have been "stove-piped" into either Short-Range Air Defense (SHORAD) or High-to-Medium Air Defense (HIMAD) career fields with little opportunity to cross over. Although some might prefer not to switch career fields, others would. Our transformation strategy focuses on growing AMD officers with a wider branch perspective. The Field Artillery and Infantry branches accomplished this transition several years ago and currently cross train their officers to diversify between their lieutenant and major years. Simply said, providing our officer's the opportunity to move be-

Figure 4 ADA Soldier Assignment Oriented Training



tween divisional and echelon above division assignments creates a larger pool of officers who can accomplish the many and varied duties that are required as a result of Army Transformation. Job satisfaction is aided by employing our officers as leaders capable of performing across the spectrum of our branch. Over the next two years the three officer areas of concentration (14A, B, and E) will be changed to one (14A [Air and Missile Defense Officer]). See Figure 5.

Our officers will continue to complete the Basic Officer's Leaders Course and take a weapons track as they do today. After an officer's first unit of assignment, some—not all—officers will be provided an opportunity to take another weapons track and be assigned to a different unit. Sometime between lieutenant and major, the goal will be for all AMD officers to experience at least two different air defense weapon platforms and echelons of assignment. A typical career map for a 14A AMD officer is at Figure 6 and 7.

As indicated above, warrant officers will be placed in tactical control and tactical director positions at each echelon with lieutenants assigned as the fire control platoon leaders and fire direction section officers-in-charge. Like Patriot units today, the divisional SLAMRAAM units of tomorrow will have tactical control officers and tactical directors manning fire direction systems with a mixture of 140E AMD warrant officers and 14A officers. Technical and tactical proficiency on their weapon platform, whether Patriot, Avenger, Linebacker, or Sentinel, has been and always will be a requirement for lieutenants; however leading their platoon will be their first priority.

Women In Air Defense. With a female officer population of about 12 percent, it is essential that we open more AMD positions to women. Not doing so would not only prevent AMD women officers from being crossed trained in more than one AMD weapon, but would likewise limit an equal number of male AMD officers. The heavy division air defense staff officer positions, air defense divisional battalion staff officer positions, and the headquarters and headquarters battery and "D" battery command positions will be opened to women. This summer air defense will place a female major into the 1st Armored Division as the assistant division air defense officer. All Corps Avenger positions in the Army National Guard will be opened to both female air defense soldiers and officers. All SLAMRAAM unit positions will be opened to women. The Army will begin fielding SLAMRAAM around 2007.

Why is our retention of AMD soldiers below the Army average and officer attrition higher? Many of the changes described above were the products of months of study related to determining why our soldier retention is below the Army average and our officer attrition is above the Army average. Over the past 10 years, many surveys and studies have been conducted by the Army Research Institute, independent organizations, and the Air Defense Artillery branch to determine why so many of our soldiers and officers leave the branch after their first or second assignment (between their fourth and sixth years of service). The key factors, common in all the surveys and studies, was job satisfaction, assignment diversity, leadership, and deployment, but some never intended to stay beyond their active duty service obligation to begin with. After all, since our recruiting efforts focus on providing money for college and teaching job skills, we must expect that a percentage are enlisting for these incentives. In June 2000 and again in June 2001, Air Defense Artillery conducted officer attrition workgroups with senior air defense officers in an attempt to identify solutions to our attrition problems. The AMD soldier transformation initia-

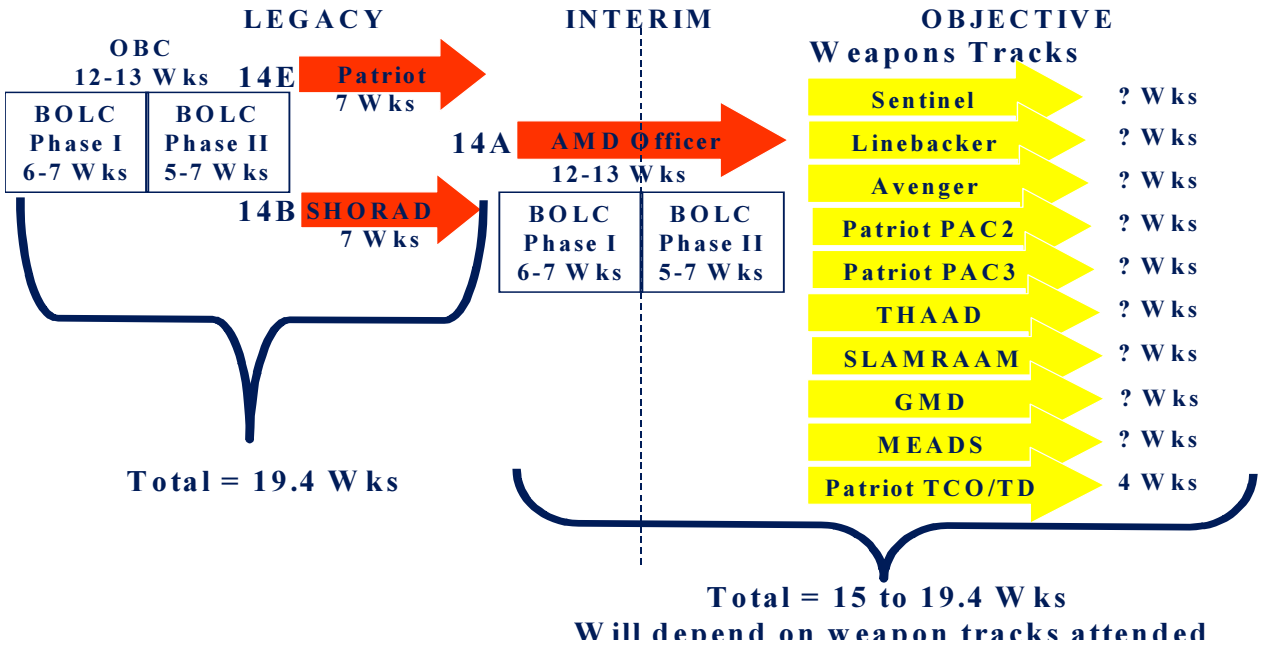


Figure 5. ADA Officer Assigment Oriented Training

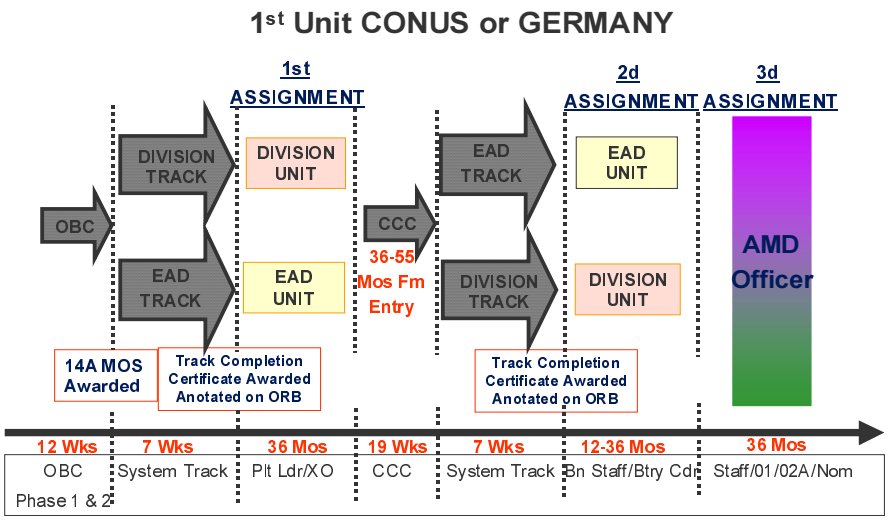


Figure 6. Air & Missile Defense Officer Career Map

tives were designed with these solutions in mind. In looking at the changes our branch needed to make in conjunction with transformation, OCADA paid particular attention to making changes that would not just be solutions to transformation challenges, but also would resolve some of the reasons soldiers identify as why they leave the branch.

Job Satisfaction. Soldiers in MOS 14E and 14J reported that they were over challenged—their MOS's gave them responsibility for not only operating and maintaining the systems and radar, but also conducting engagement and force operations. 14T soldiers reported they were under challenged—after their system was emplaced they became security guards, except for checking fuel levels or the occasional missile reload. Patriot officers reported that they came into the Army to lead soldiers, but spent the first six to nine months in a unit gaining technical and tactical proficiency on their system and Table VIII certification.

A review of table of organization and equipment positions, such as assistant fire control platoon leader (a technical versus leader duty position), tended to validate this report. We placed more emphasis on a new lieutenant becoming Table VIII certified than we did on how well he or she could lead a platoon. Because of our shortage of captains, a result of low officer accessions following the Gulf War, lieutenants throughout air defense spent precious little time as a platoon leader. As soon as they had nine to 12 months in a platoon leader position, they were quickly moved up to battery executive officer or other non-leader positions normally filled by company grade officers, including battalion or brigade tactical director, division air defense officer, and battalion or brigade staff officer. The realignment of our enlisted MOSs by function will balance the skills and task associated with each MOS, and assignment oriented training will provide the right training at the right time to all of our personnel.

Assignment Diversity. Patriot soldiers and officers reported they were not satisfied with the assignment opportunities available to them (basically Germany, Korea, and Fort Bliss, Texas). For enlisted soldiers, this is very true. For officers through battery command, it is also true; however, following battery command, officers have numerous assignment opportunities. Many soldiers, particularly those with families appreciate the repeated assignments to the El Paso area as it provides them an opportunity to purchase a home, grow equity, establish roots in a community, raise children, etc. However, not everyone wants repetitive assignments to this area. The realignment of our enlisted MOSs, the development of one officer MOS, the movement toward fire distribution sections in formerly SHORAD units, and opening more positions in air and missile defense to women will open a variety of assignment opportunities to all air defense soldiers.

Leadership. Soldiers and officers alike reported spending more time performing non-mission essential task list-related tasks than METL-related ones. This is a local command and leadership responsibility—not one that can be resolved through MOS or organizational restructuring. Both also reported that they receive little guidance, coaching, and

(Continued on page 16)

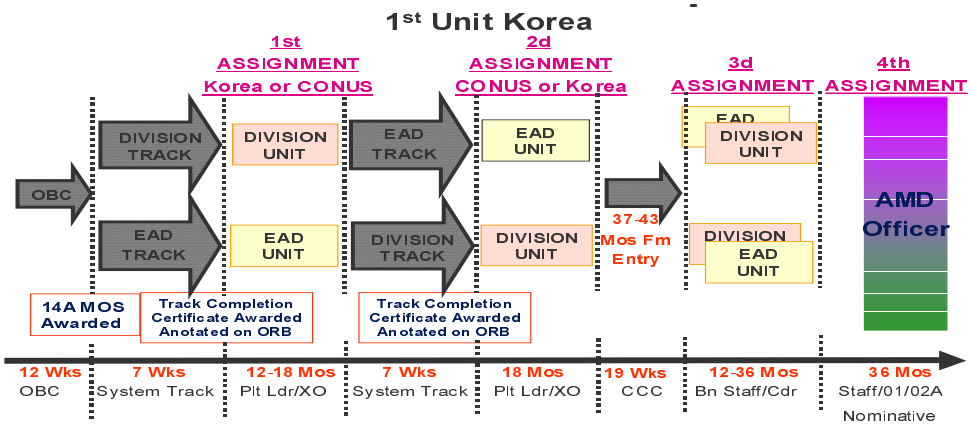


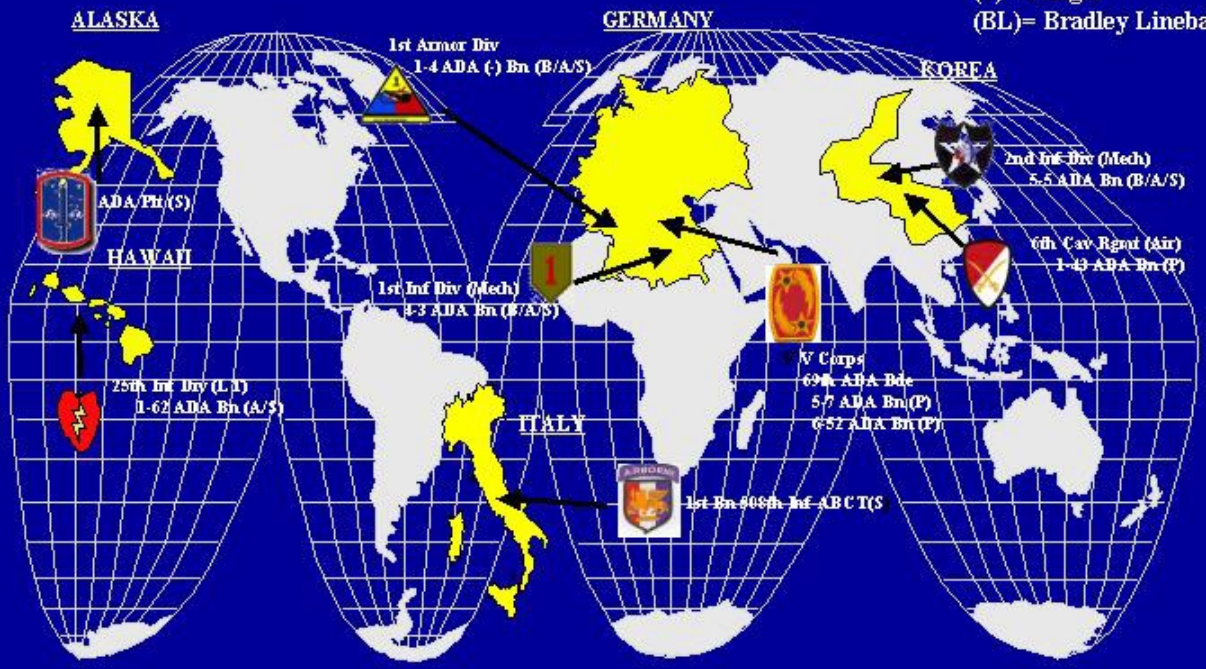
Figure 7. Air & Missile Defense Officer Career Map

ADA AROUND THE WORLD

AIR DEFENSE ARTILLERY OCONUS

Click on patches to visit unit websites.

(P)= Patriot
(A)= Avenger
(S)= Stinger
(BL)= Bradley Linebacke



AIR DEFENSE ARTILLERY NATIONAL GUARD LOCATIONS

Click On Unit Names to Visit Websites


Personnel changes permit ADA officers to move between divisional and echelon above division assignments.

mentoring. Surveys indicate that quarterly counseling, if done at all, is merely a paperwork drill to satisfy a requirement rather than provide feedback and direction to improve. More than 50 percent of lieutenants and captains attending the Captains Career Course report they were told to fill out their Junior Officer Development Support Form and turn it in. This is a rater responsibility. Raters should complete the support forms following a counseling session with lieutenants 30 days after new lieutenants arrive at the unit.

More than 50 percent of ADA lieutenants report that they never receive a copy of their rater or senior rater support form. A similar percentage report they did not submit a support form until it was time for their annual efficiency report. Is it any wonder why our soldiers and young officers question the leadership of our units? We must get back to basics.

Our surveys indicate that soldiers and officers who receive good counseling, coaching, and mentoring from their leaders (about 50 percent of our force) have a positive experience, are better soldiers and leaders, perform to higher standards, and willingly participate in unit activities. Obviously this is a top down responsibility.

In November 2001, OCADA initiated a mentoring web site at http://147.71.210.21/adamag/Mentors/Mentors.htm. AMD officers volunteered to post their names and assignment experience to this web site and act as mentors to officers requesting their advice. This web site has had more than 2,250 hits during its first eight months. OCADA also provides field commanders the results of our surveys to provide current perceptions, attitudes, and feelings of the force in regards to a variety of subjects.

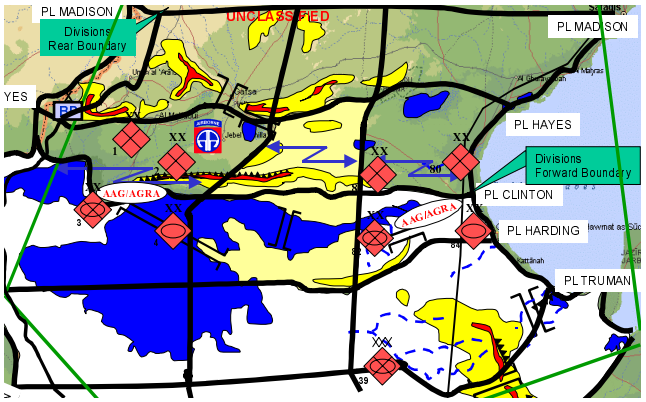
DEPTEMPO. Although deployment tempo, or DEPTEMPO, actually comprises two components—unit deployments and unit training exercises—we've come to associate it almost exclusively with major exercises and major deployments, such as Operation Enduring Freedom or the constant rotation of Patriot battalions to Southwest Asia, that take units away from their home stations. Since 1990 Patriot units have repeatedly had the highest DEPTEMPO of all Army units. In the past three years only Special Forces and Civil Affairs have had higher DEPTEMPO.

DEPTEMPO, naturally, impacts personnel tempo, the total amount of time individual soldiers are away from home for various reason, including individual training and temporary duty assignments as well as unit deployments. The FY 2000 National Defense Authorization Act requires the Army, along with other services, to track the amount of time individual soldiers spend away from home station. Since the act sets limits on the number of times per year a soldier can be deployed under normal circumstances, personnel tempo complicates and sometimes adversely impacts unit deployments. This is of particular concern in Air Defense Artillery because of the low density of our force—the relative low number of soldiers in the 14T and 14E MOSs. You may be familiar with Patriot units' reputation as low-density and high-demand type of unit. The high demand comes from the fact that Patriot has been involved in continuous deployments since 1990, with no relief in sight. Once again realignment of our MOS's with assignment diversity will provide opportunity for all air defense soldiers and officers to participate in and share these deployments.

Air and missile defense soldiers will bear a heavy burden of responsibility in a post-9/11 world in which national as well as theater air and missile defense have been declared top national priorities. The MOS realignments and personnel management upgrades described in this article will make our soldiers' burden easier to bear by increasing assignment and promotion opportunities. They also will help us produce soldiers and units fully capable of meeting the challenges ahead.

Lt. Col Barry G. Halverson is the Director, Office, Chief of Air Defense Artillery, U.S. Army Air Defense Artillery School, Fort Bliss, Texas.

The tactics, techniques, and procedures outlined by this article and employed by the 108th ADA brigade in support of XVIII Airborne Corps operations are absolutely on target as demonstrated during numerous exercises. I have complete confidence that the Corps would enjoy outstanding Air and Missile Defense protection in any future operation mainly because the soldiers and leaders in ADA outfits throughout the Corps are the best air defenders there are.— Lieutenant General Dan K. McNeill, Commanding General, XVIII Airborne Corps



Air Defense Artillery in Support of the Corps

Emerging Doctrine in Integrating and Synchronizing Air and Missile Defense Combat Power

by Major Michael F. Tronolone Jr.

Although emerging technologies and organizational changes appear to offer a potential solution to protecting the maneuver force, the key to effective synchronization of air and missile defense operations with corps and divisions is thorough and continuous coordination between numerous commanders, staffs, and headquarters. This coordination relies on aggressive, technically and tactically competent air and missile defense (AMD) officers who are thoroughly versed in both maneuver and air defense doctrine and have the initiative to plan and coordinate their efforts both vertically (between higher and lower headquarters) and horizontally (across divisional and corps boundaries).

Due to the dramatic changes in warfighting doctrine caused by the Army's ongoing transformation efforts, as well as the rapid pace of these changes, current Air Defense Artillery (ADA) doctrine does not always adequately integrate and synchronize air and missile defense operations throughout the force.

This article outlines one approach to synchronizing AMD at the corps and division level. It outlines how AMD officers throughout the corps plan, integrate, and synchronize air and missile defense operations in support of the maneuver force. This article is not intended to be a detailed planning manual, but a primer on emerging doctrine that is successfully being used to integrate and synchronize AMD combat power in support of corps and divisional maneuver forces.

Transformation

Acknowledging the need to change and meet the defense challenges of the future, the Secretary of the Army and the Army Chief of Staff articulated in October 1999 a clear Army Vision: "Soldiers on point for the Nation, transforming the most respected Army in the world into a strategically responsive force that is dominant across the full spectrum of operations." To support this vision, the Army is revising its current doctrine that supports decisive combat over a well-defined, conventional adversary in a mature, well-known theater of operations to a doctrine that supports a force that is strategically responsive and dominant at every point on the spectrum of operations. As the Army's doctrine evolves, current ADA doctrine is emerging to support these changes. Although in revision, FM 44-100, U.S. Army Air Defense Operations, remains the capstone ADA doctrinal manual. Supporting this capstone manual are numerous publications that outline how the various ADA units doctrinally support the maneuver force. These manuals include: FM 3-01.7, Air Defense Artillery Brigade Operations, FM 3-01.85, Patriot Battalion and Battery Operations, and FM 44-64, SHORAD Battalion and Battery Operations.

While each doctrinal manual provides clear guidance for each air defense organization, e.g., corps ADA brigade, divisional air defense battalion, and Patriot battalion, current doctrine does not adequately "nest" the different levels of air defense together. For example, none of the aforementioned manuals discusses how the divisional air defense battalion coordinates with the corps ADA brigade to submit divisional critical assets for inclusion in the corps' defended asset list (DAL). Additionally, there are no references to air defense

At left, a 108th ADA Brigade Stinger team in training. At right, soldiers of XVIII Airborne Corps' 82nd Airborne Division jump during a training exercise.

Soldiers of the 1st Batalion, 7th Air Defense Artillery, 108th ADA Brigade, deploy from Biggs Army Air Field, Fort Bliss, Texas, at the begining of a Patriot task force rotation to Southwest Asia.

backbriefs from the divisional ADA battalions or an integrated ADA rehearsal of all ADA assets within the corps. Collectively, these procedures are critical to the effective integration and synchronization of ADA combat power with the maneuver force. In order to effectively support maneuver forces, every level of air defense must understand how ADA "doctrinally" supports maneuver units at the corps and division levels.

Emerging Doctrine

Effective AMD is both a top-down and bottom-up process. Beginning at the top, the corps commander determines air defense priorities and an initial critical asset list (CAL) for theater ballistic missiles (TBM) and air breathing threat (ABT) defense. Divisions refine the corps' initial CAL and submit additional critical assets based on their concept of the operation. The corps ADA brigade combines these lists and apply Criticality, Vulnerability, Recuperability, and Threat (CVRT) analysis to determine a proposed defended asset list (DAL). Once the proposed DAL has been approved by the corps commander, the corps ADA brigade begins the intricate process of synchronizing ADA combat power at the proper time and place to ensure the corps and division plans are adequately supported. The development of the enemy air and missile event template plays a crucial role in the brigade's planning process. Before developing a friendly air defense course of action, the corps ADA brigade commander and staff must have a clear understanding of how, when, where and why the enemy will employ his air and missile assets.

As the corps and divisions continue to refine their maneuver plans, feedback from the divisions back up to the corps forces the ADA brigade to continually update and modify its scheme of ADA support in order to protect the maneuver force and achieve the corps commander's intent. Corps ADA brigade liaison officers working at the divisions provide the critical link between the divisions and the corps ADA brigade in this bottom-up synchronization. Finally, air defense backbriefs from all of the ADA battalions throughout the corps complete the bottom-up feedback and culminate in a detailed air defense rehearsal which ensures that all air defenders throughout the corps understand how higher, lower, left, and right air defense units are synchronized with each other and their supported maneuver forces.

On paper the process of integrating and synchronizing air and missile defense forces with corps and division maneuver forces appears simple; however, it is one of the most difficult tasks air defenders must understand and execute. Due to the ongoing doctrinal changes caused by the Army's transformation, current air and missile defense doctrine cannot keep up with the changes occurring in the field. The following pages outline key air and missile defense tactics, techniques, and procedures (TTPs) being successfully used to facilitate the planning, synchronization, and execution of air defense in support of corps and division maneuver forces.

Building the ADA Team

Before any exercise or real world operation begins, the corps ADA brigade commander must build his "team." The "team" consists of all air defenders within the corps: organic corps ADA brigade assets, including Patriot and Army National Guard (ARNG) Short-Range Air Defense (SHORAD) commanders and staffs, divisional ADA battalion and separate battery commanders, and air defense liaison officers within corps, division, and separate brigade staffs. Although current doctrine does not clearly recognize any command relationship or coordination responsibility with these elements, effective integration and synchronization of ADA combat power within the corps relies on the close interaction of all

these elements. Every air defense unit supporting echelons from corps to maneuver brigade must understand what each other is doing and who is responsible for defeating which threat.

After the "team" is assembled, the corps ADA brigade commander disseminates his philosophy and warfighting principles. The corps ADA brigade commander begins by outlining how he wants to employ his organic air defense assets. For example, Patriot forces in 108th ADA Brigade are used as the base air defense system providing tactical ballistic missile (TBM) coverage of corps and division critical assets, and as available, ABT coverage of forward maneuver brigades. Army National Guard SHORAD forces are used to augment divisional air defense coverage and provide ABT coverage of critical corps assets such as ATACMs capable MLRS and Q-37 radars.

This philosophy may be different for each of the corps ADA brigades. XVIII Airborne Corps, consisting of three light and special divisions, one heavy division, and a light cavalry regiment, places considerably more importance on its aviation and long-range artillery assets since they are the principle killing mechanisms for the corps. This is in contrast to III Armored Corps, which consists of two heavy divisions and an armored cavalry regiment, and places greater importance on its heavy maneuver forces that possess the majority of III Corps' combat power.

After discussing how organic corps air defense assets will be employed, the ADA brigade commander also outlines how much risk he is willing to accept with these forces. Although this will change based on mission, enemy, terrain and weather, troops and support available, time, and civil considerations (METT-TC) for each operation, the brigade commander must delineate a baseline risk for how he will employ his forces. For example, the baseline risk assessment for Patriot forces in the108th ADA Brigade is to be positioned outside of enemy rocket artillery range, while the 31st ADA Brigade attempts to position Patriot fire units outside of tube artillery range.

Finally, the ADA brigade commander ensures the different air defenders in the corps understand the role, function, capabilities, and limitations of each other's assets. All air defenders within the corps must thoroughly understand each other's philosophy and warfighting principles to ensure that all corps air defenders speak the same "truth."

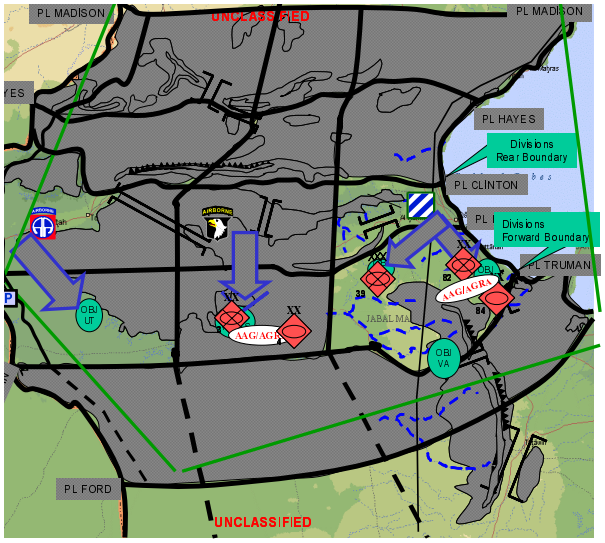
The 108th ADA Brigade commander distributes his philosophy and warfighting principles by conducting a yearly XVIII Airborne Corps ADA Warfighting Conference during the World Wide Air and Missile Defense Conference at Fort Bliss, Texas, and through bi-monthly video tele-conferences (VTCs) with the divisional ADA battalion commanders and staffs. These events help ensure that all air defenders within XVIII Airborne Corps understand what each organization brings to the fight and how to best employ and synchronize the various units and systems to provide air defense to the entire corps. By outlining his philosophy prior to an exercise or real world contingency, all the players on the corps' ADA team understand how the corps' air defense forces integrate with each other and support the maneuver fight.

Corps Planning

Having gained an understanding of how AMD operations in support of the corps' maneuver forces will occur, the corps' air defense planners are ready to begin the Military Decision Making Process (MDMP). The Corps Air Defense Element (CADE), which serves as the corps ADA brigade's liaison element to the corps headquarters, is critical to air defense's success. As the only air defense representative on the corps' planning staff, the CADE planner begins the initial integration and synchronization of ADA combat power with the maneuver force.

A corps ADA brigade's mission is significantly different than an echelon above corps (EAC) ADA brigade's. While an EAC brigade provides primarily TBM defense of relatively static assets, such as airports of debarkation, seaports of debarkation, and command and control nodes (C2) supporting a joint task force, corps ADA brigades provide both TBM

Corps assets assembled at seaports are especailly vulnerable to air and missile attack. Above, M1A1 Abrams Main Battle Tanks and protective-wrapped CH-47 Chinook helicopters cover a seaport holding area.



Corps ADA brigades must be fully integrated into the division and corps planning process to anticipate future air defense needs.

and ABT defense of maneuvering corps and division assets, including aviation FOBs, corps and division C2 nodes, fire support assets, and logistics storage areas. To be successful, corps ADA brigades must work closely with EAC units to determine which corps rear area (CRA) assets the EAC forces can protect. This allows the corps ADA brigade assets, particularly during offensive operations, to concentrate on integrating and synchronizing with the corps and division maneuver forces, while the EAC ADA forces focus on relatively static CRA logistics assets.

Corps ADA brigades must be fully integrated into the division and corps planning process to anticipate future air defense needs. This is why the CADE's role is critical to successful air and missile defense planning. To be effective, CADE personnel should: one, have a comprehensive knowledge of all AMD systems capabilities and limitations; two, have a clear understanding of the corps ADA brigade commander's warfighting philosophy and intent and be able to articulate this to the corps staff; three, thoroughly understand the corps' maneuver plan as well as the enemy's most likely and most dangerous courses of action; four, develop personal and professional relationships with key members of the corps staff; and finally five, represent the brigade commander and staff through all stages of planning and execution.

A 108th ADA Brigade soldier maneuvers a Partriot antenna mast into position.

The CADE is the bridge, the vital link, between the brigade staff and the corps. Failure to properly portray the ADA brigade's capabilities and limitations to the other corps and division planners causes all future planning to be faulty. In addition to normal contributions as part of the corps' MDMP, emerging doctrine has the CADE planner producing two critical products: the corps' initial critical asset list (CAL) and the corps' macro ADA defense design.

CAL Development

The initial critical asset list, better known as the CAL, is the single most important product the CADE planner must produce during the corps' MDMP. The CAL drives all future corps ADA brigade planning. The initial CAL is a proposed list of TBM and ABT critical assets based on the corps' friendly course of action development; it normally includes assets such as attack aviation assembly areas, corps and division command and control (C2) nodes, and logistics support areas (LSA) (specifically Class III and V storage sites). This is only an initial CAL since the divisions may have different critical assets after they conduct their MDMP. For example, the corps' initial CAL may include division tactical (DTAC) and main command posts; however, the division may choose to accept risk on their tactical and main command posts to cover their reserve. (Based on METT-TC, divisions normally are allocated one or two Patriot batteries that will be General Support-Reinforcing [GS-R] to the division in order to cover their specific critical assets; however, coordination for these assets cannot occur until after the divisions conduct their MDMP.)

Current doctrine does not distinguish between a CAL and a DAL, although they are two distinctly different lists performing two distinctly different functions. A CAL con-

A 108th ADA Brigade soldier guides a Patriot radar into position.

sists of important assets the corps and divisions want protected. This is the wish list, developed without constraints. The CAL is developed during the corps' course of action development, and is refined after the divisions and separate corps units submit their respective critical assets. This product is then used by the corps ADA brigade to develop the proposed DAL. Unlike the CAL which is developed free of constraints, the DAL is the list of assets that can actually be provided TBM and ABT defense based on the constraints caused by enemy and friendly units, terrain, and mission.

Macro ADA Defense Design

After developing an initial CAL, the CADE planner develops a macro ADA defense design to ensure that the corps ADA brigade will be able to integrate and synchronize Patriot coverage throughout all phases of the operation. The CADE planner works closely with the brigade S-3 to develop an initial macro ADA defense design that is able to support the corps' initial CAL and has enough flexibility to support any changes to the initial CAL submitted by divisions or other corps forces after they have conducted their MDMP. This initial macro defense design is used by the CADE planner during the corps' hasty and deliberate wargames to determine if a friendly course of action (COA) passes the feasibility, acceptability, and suitability (FAS) test.

Normally this macro ADA defense design focuses on Patriot TBM defense of the initial CAL and any subsequent changes to the CAL based on the corps' concept of the operation. This is only a "best guess" but it is critical to future planning. Without this initial ADA macro defense design, the CADE planner has no means of determining whether the corps' friendly COA is feasible from an air defense perspective.

The development of this initial macro ADA defense design ensures there is at least one FAS air defense course of action available to support the corps' scheme of maneuver. Although this defense design is based on the initial CAL, not the approved DAL, it is essential that the CADE planner begin coordinating positions with known corps critical assets early in the wargaming process.

Failure to coordinate with these units will potentially cause some of these assets not to receive Patriot coverage due to the limited number of assets available (normally 10 Patriot batteries per corps ADA brigade). This is especially important in XVIII Airborne Corps since it has four divisions worth of attack aviation, logistics, and C2 nodes to protect in addition to the standard number of corps aviation, C2, and logistics assets. Once the corps publishes its operation order and graphics, it is extremely extremely difficult, if not impossible, to move these critical assets to receive Patriot protection.

108th ADA Brigade soldiers respond to a simulated gas attack during training at Fort Bliss, Texas..

A 108th Brigade tactical operations center under camouflage during a field training exercise.

Aggressive coordination by the CADE planner during the corps' course of action development may allow additional critical assets to be included on the final DAL by co-locating critical assets near each other, thereby economizing the number of Patriot units required to protect the critical assets. For example, by coordinating for the Corps Main CP to collocate with the corps attack aviation regiment's assembly area, one Patriot battery can protect two corps critical assets, freeing another Patriot battery to protect lower priority critical assets such as one of the corps' logistic support areas (LSA). After finalizing this coordination, the CADE planner passes the initial CAL and initial macro ADA defense design to the corps ADA brigade for continued refinement and development of the proposed DAL.

Brigade Planning

The brigade staff receives all available information from the CADE and immediately begins its MDMP, normally before the corps has even issued its order. Throughout the corps' MDMP the brigade staff, especially the S-2 and S-3, has been thoroughly involved in assisting the CADE planner in developing the corps' plan. This parallel planning is essential for effective integration and synchronization of ADA combat power with maneuver forces. If air defense commanders and staffs wait until their higher headquarters has issued its order before beginning air defense planning, the unit will never be able to effectively integrate and synchronize ADA combat power with its supported maneuver force. ADA commanders and staffs must anticipate air defense requirements based on a thorough understanding of the enemy's most likely and dangerous courses of action in relation to the approved friendly course of action.

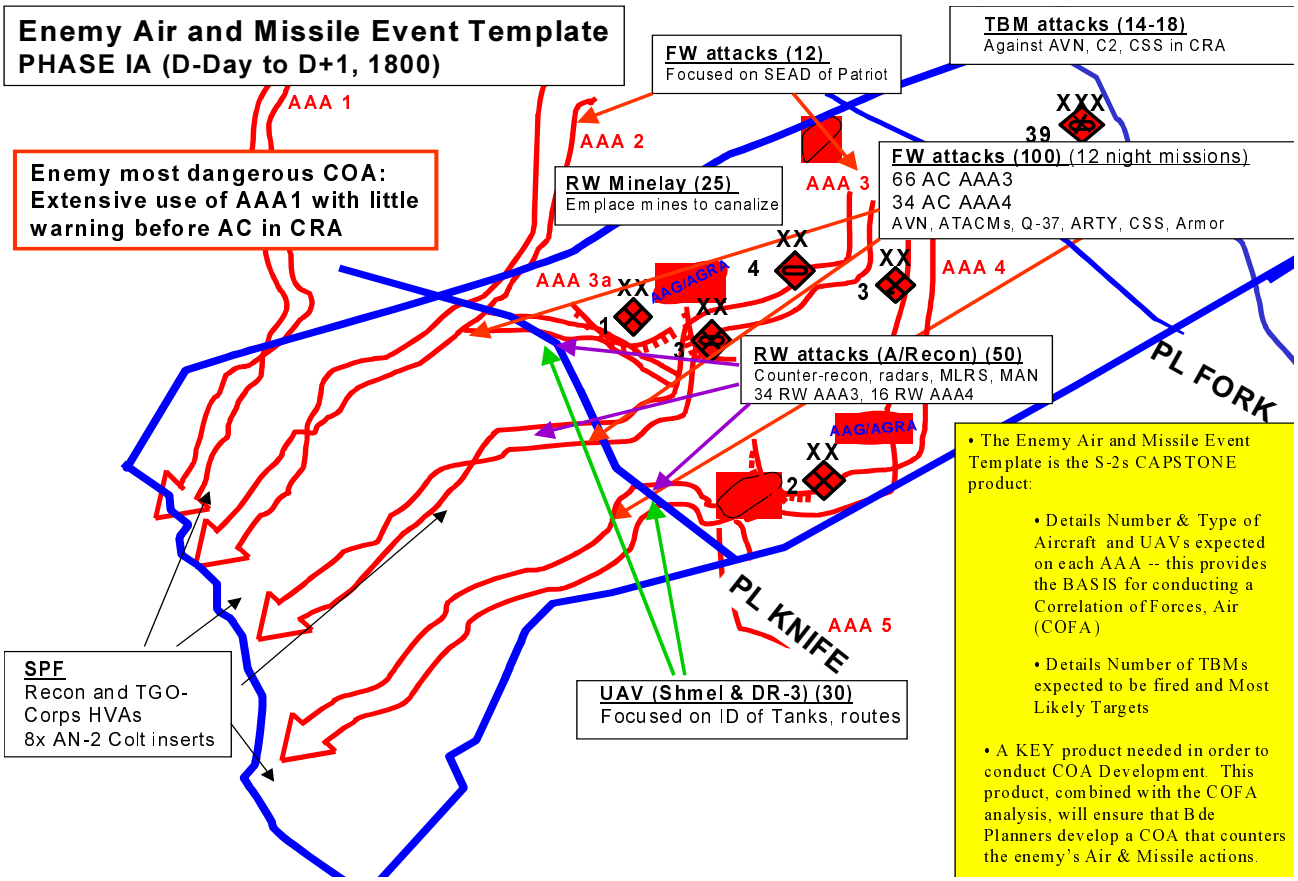
The ADA brigade's primary planning responsibility is to refine the initial macro ADA defense design developed between the CADE planner and the brigade S-3 into an executable plan to be handed off to the subordinate ADA Patriot and Army National Guard SHORAD battalions. The brigade focuses its planning efforts on finalizing a DAL, defining task organizations and command and control relationships, and resourcing battalions to accomplish their given tasks and purposes. To assist in accomplishing these functions, emerging doctrine has the corps ADA brigade staff developing three important products: the enemy air and missile event template, the correlation of forces-air (COFA), and the proposed DAL.

Enemy Air and Missile Event Template

Current military intelligence and air defense artillery doctrine does not adequately prepare ADA planners to visualize how the enemy will employ his forces. Without an accurate assessment of how the enemy commander will use his air and missile assets in support of his ground scheme of maneuver, all future air defense planning will be faulty. To properly develop the enemy air and missile event template, the brigade S-2 must not only fully understand the enemy ground courses of action, but must also understand the enemy special purpose forces, long-range artillery, and potentially weapons of mass destruction (WMD) schemes of support since they significantly affect how the enemy will employ his air and missile assets. Failure to provide an accurate assessment of how the enemy commander will employ his air and missile assets will skew all future friendly planning to counter or negate these threats.

The brigade S-2 receives the corps G-2's full assessment of the enemy's most likely and most dangerous courses of action and uses these products in conjunction with the friendly operational intent to develop the enemy air and missile event template. The event template will be used throughout the brigade's MDMP, COA development, and wargaming. The S-2's development of the air and missile event template must be firmly anchored in the enemy's most likely COA. Commitment of the enemy commander's air and missile assets will closely follow his ground main effort and where he perceives the utilization of these limited resources will achieve the most success. While the numbers of aircraft and missiles may be "science" oriented, the exact commitment of these assets is still to a large degree an extremely "art" oriented process. As discussed earlier, the brigade S-2 must analyze the enemy's strategic, operational, and tactical objectives, and his ground maneuver plan to accomplish these objectives, and then determine how he will use his limited air and missile assets to support the enemy's overall plan.

This process is the "Achilles Heel" of many air defense and military intelligence officers since it relies on multiple, independent variables like terrain, weather, success or failure of the friendly plan, and to a certain extent the subjective judgment of how the enemy commander will use his versatile air and missile assets. Although difficult, this is a critical step in properly supporting corps and division maneuver forces. Without an accurate depiction of how the enemy will most likely employ his air and missile assets, the brigade S-3 cannot properly develop friendly courses of action to counter this threat. To be successful, ADA forces must mass their limited assets not only at the proper place on the battlefield,



but at the proper time. Attempting to provide an area defense of corps and division critical assets only results in failure. As Frederick the Great realized, "He who defends everywhere defends no where."

One technique used in 1088th ADA Brigade to develop the enemy air and missile event template is to have the brigade S-2 and S-3 conduct an informal wargame. The S-3 provides the enemy's high value target (HVT) list: what the enemy commander wants to destroy with his air and missile assets, as well as the friendly scheme of maneuver highlighting critical events where the enemy historically surges his air: during river crossings, forward passages of lines (FPOL), to block friendly penetration of the main defensive belt, etc.

The S-2 and S-3 then wargame potential enemy courses of action to attack these targets discussing how the enemy will use each of his assets. For example: rotary wing aircraft will fly over-the-shoulder in support of penetrations of the battle zone, fixed-wing close air support (CAS) will fly against friendly second echelon or reserve forces in order to disrupt the friendly attack to create separation between forces, and Mi-8 HIPs will be used to emplace mines along high-speed avenues of approach in order to disrupt the friendly attack. The S-2 and S-3 go back and forth with each system: rotary wing (RW), fixed wing (FW), unmanned aerial vehicles (UAV), TBM, special purpose forces (SPF), and long-range artillery to visualize when, where, and how the enemy commander will employ his air and missile assets. This informal wargame results in the initial air and missile event template.

This template includes numbers and types of aircraft flying along various air avenues of approach (AAA), as well as when these assets are expected to be employed. For example, 4 Su-24 fly along AAA2 at BMNT on D+5 IOT block friendly penetrations of the main defensive belt. Additionally, this template outlines how the enemy will employ his missile forces and any other assets that may affect AMD employment. These assets include the use of SPF, WMD, and long-range rocket artillery, including 9A52s and WM-80s. The air and missile event template enables the friendly air defense commander and staff to visualize when, where, how, and why the enemy will employ various forces to affect the aerial dimension of the battlefield. Only after the staff fully appreciates the threat can they develop feasible, acceptable, and suitable friendly courses of action to defeat it.

Correlation of Forces – Air (COFA)

After the S-2 has developed the enemy air and missile event template, the brigade S-3 conducts an initial COFA comparison. Although correlation of forces and means (COFM) has been a standard procedure in corps and division planning for years, air defense doctrinal manuals have only recently included the use of COFA. Unlike the enemy air and missile event template which is very subjective or "art" oriented, COFA analysis is very objective or "science" oriented. It allows an air defense staff to quantify air defense requirements based on the enemy's air and missile order of battle.

The brigade S-3 conducts an initial COFA analysis during the brigade's mission analysis to determine if enough aggregate AMD forces are available to defeat the enemy air threat. Although force ratio comparison figures exist for conducting a correlation of forces against TBM, the process relies heavily on assumptions about successful friendly attack operations against enemy TBM forces. Additionally, this comparison does not take into account the brigade's actual DAL or the level of protection required on a particular asset. Field Manual 3-01.7, Air Defense Brigade Operations, offers one method of COFA development in Appendix B, Air Intelligence of the Battlefield. The following outlines a slightly different method used effectively by numerous CONUS and OCONUS divisional and corps air defense units over the past several years.

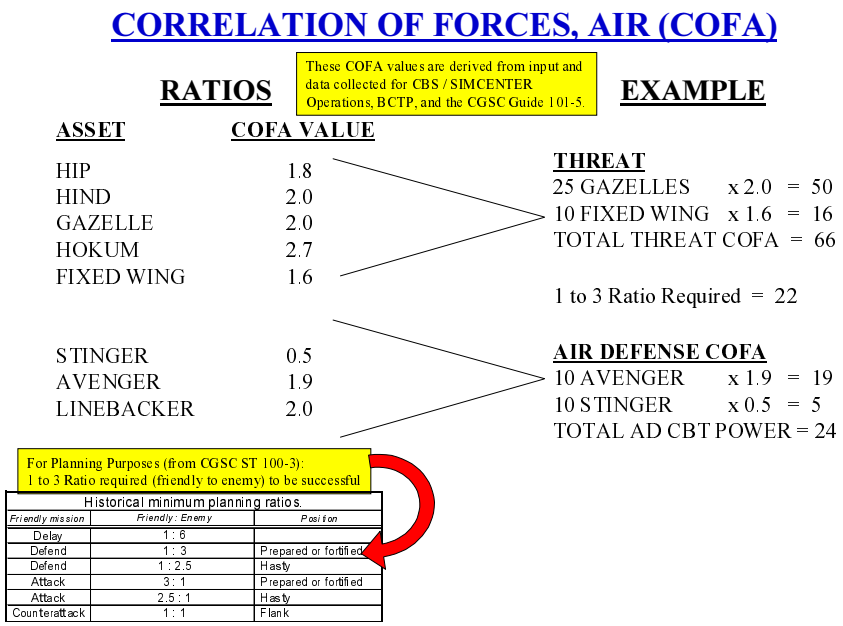
The COFA process begins with the brigade S-2 combining the enemy fixed- and rotary wing orders of battle with facts/assumptions on the enemy's attrition and operational readiness rates to develop a rough enemy correlation of forces factor. This comparison is conducted using both day and night planning factors for friendly and enemy forces. (ADA requirements are significantly different between day and night operations due to the availability of both friendly and enemy night capable platforms.) The accepted COFA planning requirement is to have a minimum of a one to three, friendly to enemy force ratio for both day and night operations since the friendly air defense forces are defending against the enemy air attack. During mission analysis this rough, aggregate estimate is used to ensure that the corps as a whole has enough air defense assets to defeat the enemy air activity expected in the corps' area of operation. Specific COFA analysis will be conducted on each air avenue based on the S-2's final enemy air and missile event template and the friendly COA being wargamed.

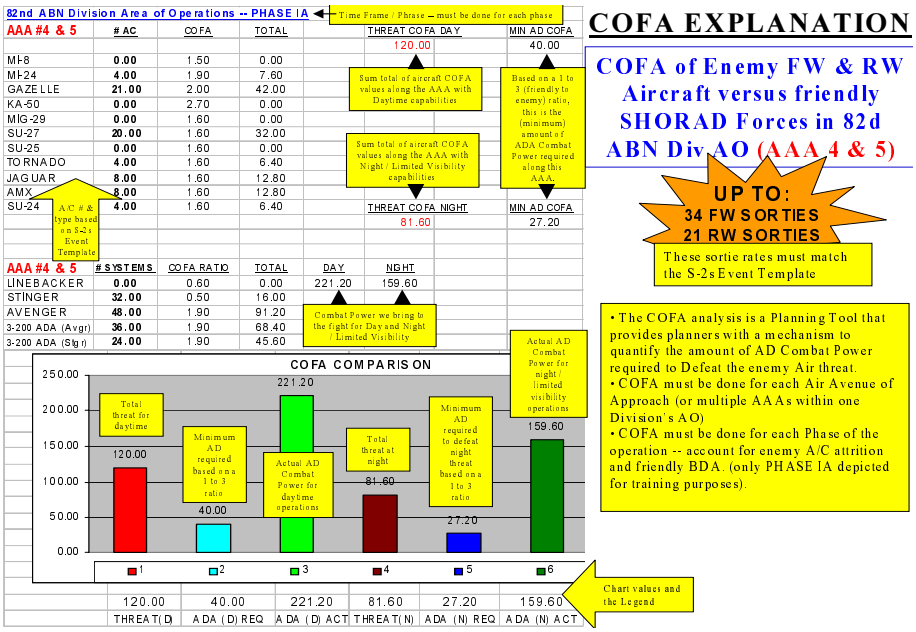
This analysis is normally one of the commander's evaluation criteria for COA comparison. This process provides a quantifiable estimate of the feasibility of a given friendly COA in relation to the anticipated enemy air and missile threat; however, COFA analysis is only an estimate. Friendly courses of action must be flexible enough to account for unanticipated use of enemy air and missile assets. The enemy commander has a vote, and his vote is not always in accordance with the brigade S-2's. Although an extremely effective tool in ADA planning, proper COFA analysis does not guarantee success. Aggressive, technically and tactically competent air and missile defense soldiers who are able to think on their feet and execute within their commander's intent are the key to battlefield success.

DAL Development

With a thorough understanding of the enemy's air and missile event template, a favorable COFA analysis, an approved mission statement, and any additional guidance the brigade commander provides, the brigade S-3 and staff begin to develop potential friendly courses of action to counter this threat. The first step in COA development is to take the corps' initial CAL, and based on the S-2's final air and missile event template, conduct a CVRT analysis on each critical asset in order to rank order the assets. With this rank ordered CAL (still not a DAL), the brigade S-3 begins placing Patriot batteries to cover the prioritized CAL starting at the highest priority asset and working his way down the list. Once an asset has been assigned a Patriot unit to protect it, the asset changes from a critical to a defended asset. After all available Patriot forces have been tasked, the assets that have received coverage form the proposed DAL. Only after the corps commander approves this recommendation is the approved DAL disseminated.

Once the initial DAL is approved, reprioritization of the DAL is a constant and evolving process. Just as EAC brigades participate in reprioritization boards to determine changes to the JTF commander's DAL, corps ADA brigades must continually anticipate and plan for changes to the corps' DAL. The difference in the reprioritization process between EAC and corps ADA forces is the time frame for reprioritization. EAC units normally view the reprioritization process similar to the Air Tasking Order (ATO) process, anticipating requirements 72-96 hours in advance. Corps ADA brigade's do not have this luxury, normally having to anticipate requirements 24-48 hours in advance. Just as in the initial DAL development, the brigade conducts its CVRT of potential critical assets in order to prioritize the updated CAL, conducts its defense design planning to determine which





assets can be defended, then submits its proposed updated DAL to the corps commander for approval. Due to the fluid nature of maneuver operations, the corps' reprioritization process is normally extremely compressed and less formal than the JTF's process. The end result of the ADA brigade's planning process is the production and distribution of the brigade's Operation Order (OPORD). The OPORD includes the corps commander's approved DAL, the brigade's decision support template (DST) with operational timeline and decision support matrix (DSM), and any specified tasks and coordinating instructions required for effective synchronization of ADA combat power with both its organic subordinate battalions and the other ADA forces within the corps.

Synchronization

Many air defense planners erroneously believe that once the ADA brigade's OPORD is published the difficult part is over. This is exactly the opposite of the truth. After the brigade publishes its OPORD, the detailed work of synchronizing air defense combat power with maneuver forces begins. As stated earlier, the corps ADA brigade and the divisions receive the corps' OPORD at the same time and begin planning simultaneously. The initial corps' critical asset list only reflected the corps planner's vision of the divisions' critical assets. As the divisions and other subordinate corps forces finalize their plans, the ADA brigade's initial plan must adapt to ensure that ADA combat power supports the force. The ADA brigade uses three different tools to ensure that air defense remains integrated and synchronized with the maneuver force: attachment of liaison officers (LNOs), air defense backbriefs, and a combined air defense rehearsal.

Liaison Officers

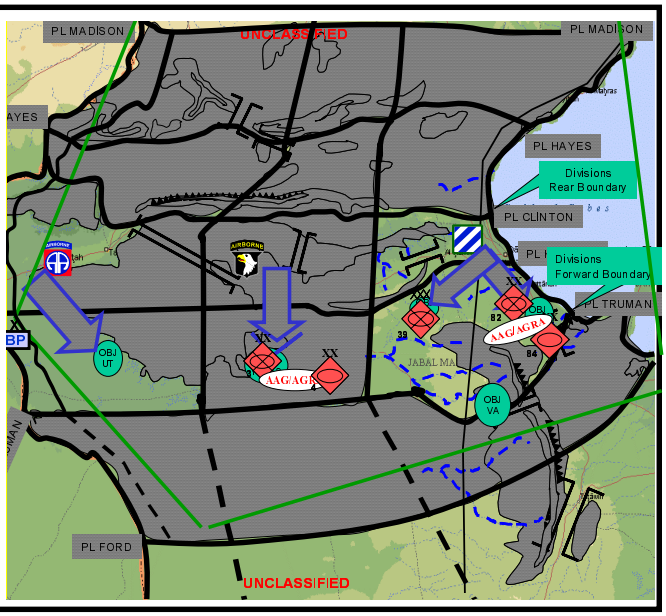
Liaison officers are the most important element in integrating and synchronizing air defense with corps and divisions. They are the link that ties the corps ADA brigade into the divisions' maneuver plans. Although coordination with the assistant division air defense officer (ADADO) is important, his primary focus is on developing the division air defense plan in coordination with the divisional ADA battalion commander and S3. The corps ADA brigade liaison officers provide High- to Medium-Altitude Air Defense (HIMAD) expertise to the ADADO during division level planning and assists the corps ADA brigade S-3 in integrating and synchronizing both Army National Guard SHORAD assets and Patriot into the divisional scheme of maneuver.

Although this job is critical to the ADA brigade's warfighting success, current tables of organization and Equipment (TO&E) do not provide for liaison officers to divisions and other supported forces. Historically, these officers and NCOs are taken out of hide from the brigade's Patriot battalions. This is acceptable during peacetime exercises such as the battle command training program's (BCTP) warfighter exercises (WFX) where only the brigade and battalion staffs participate; however, this cannot happen during actual deployments. Liaison officers need to be seasoned captains and senior NCOs who not only understand the technical capabilities and limitations of their systems, but are also able to conduct division and corps level planning. Liaison officers must have a thorough understanding of the military decision making process, the brigade's planning philosophy, and the brigade commander's intent. Additionally, LNOs must understand the enemy air and missile event template and be able to anticipate likely enemy actions and reactions to friendly courses of action.

During execution the LNO provides updates to the ADA brigade commander and staff on the execution of the division's plan. The LNO must be able to anticipate future air defense requirements based on the success or failure of the division's plan. The LNO works closely with the ADADO and the division planning team to develop branches and sequels to the base plan. The LNO is the eyes and ears of the brigade commander and staff. He allows the corps ADA brigade to be proactive in its defense design, anticipating future requirements well in advance of needs.

LNOs also provide the key link in synchronizing corps ADA assets within the divisional area of operations. The LNO works closely with the division transportation officer (DTO) and Division Rear (DREAR) Command Post to establish movement routes and coordinate security and survivability assets (engineers and smoke if required). He also works with the DREAR to deconflict land requirements and with the DISCOM/Corps Support Group (CSG) to work on resupply issues. He is the brigade's trusted agent in the division. Without experienced, aggressive liaison officers,

"Nothing places greater discredit on the branch and challenges confidence in our warfighting ability than a maneuver commander receiving different assessments of air defense capabilities and limitations in support of a scheme of maneuver from different ADA organizations."



the corps ADA brigade would not be able to effectively integrate and synchronize its ADA combat power with the supported maneuver forces.

ADA Backbriefs

Once the corps ADA brigade issues its order, subordinate battalion commanders, including divisional ADA commanders, conduct an immediate confirmation brief to ensure that they fully understand the brigade commander's mission and intent. After the confirmation brief, the subordinate battalion staffs complete their MDMP. Before issuing an order to their subordinates, the battalions conduct backbriefs to the brigade to ensure that their plan will meet the brigade commander's intent and is nested with the other brigade and divisional ADA battalion plans.

In a perfect world, all the subordinate ADA battalions, including the divisional ADA battalions, would conduct their backbriefs at the same time. This method ensures that all units understand each other's mission and the mission of ADA forces higher, lower, left, and right. Due to competing time requirements with the supported maneuver forces and distance factors; (XVIII Airborne Corps has a total of nine air defense battalions within the corps: four divisional ADA battalions, two Patriot battalions, and three Army National Guard SHORAD battalions that are spread over 10 different installations from New York to New Mexico); the corps ADA brigade normally conducts backbriefs with the organic brigade units first, to ensure their plans meet the brigade commander's intent and are nested with each other.

At a later time, the brigade receives the divisional ADA battalion's backbriefs. Although there is currently no doctrinal requirement for the divisional ADA battalion commander's to backbrief the corps ADA brigade commander, these backbriefs are critical to the effective synchronization of air defense throughout the corps. The ADA backbriefs enable all parties to see how air defense is being fought across the corps, both higher and lower as well as left and right. This is the first opportunity to discover gaps in coverage along flanks of divisional boundaries, or redundancy in coverage that may be used elsewhere. After the brigade commander receives all the subordinate backbriefs and issues his guidance, each air defense unit refines its plan to take into account the employment of the other air defense forces throughout the corps.

ADA Rehearsal

After completing the backbriefs and deconflicting gaps in weapon and sensor coverage throughout the corps, subordinate battalions finalize their plans and issue their orders. The final step in synchronizing air and missile defense operations with corps and division maneuver forces is to conduct an air defense rehearsal with all the corps air defense team members. The same timing and distance factors that affected coordinating backbriefs effect the ADA rehearsal; however, it is imperative that all the team members participate in the rehearsal at the same time. Technological solutions such as video tele-conferences (VTCs), or collaborative planning tools such as the Information WorkSpace (IWS), allow various ADA team members to participate distributively, while others are present at a central location. Regardless of how each team member participates, the ADA rehearsal is essential in ensuring that ADA combat power is synchronized throughout the corps.

Numerous techniques for conducting rehearsals exist; no matter which technique is used the key outcome is that all ADA players understand the mission and intent of each other's plan by phase. Understanding the who, what, when, where, and why of each ADA elements' plan by phase ensures that all ADA combat power is integrated and synchronized with each other and the supported maneuver force. This is particularly important to the integration and synchronization of corps ADA forces, both Patriot and SHORAD, with the divisional maneuver plans. Divisional ADA battalion commanders must fully understand the mission and in-

tent of corps Army National Guard SHORAD forces operating within the division. Most importantly, divisional ADA commanders and staffs must understand the GS-R Patriot scheme of support within the division.

Due to the extremely low density of Patriot forces within the corps, each Patriot move requires two and three star approval. Before any Patriot movement occurs, various criteria must be met. These criteria include: status of movement routes, disposition of enemy SPF and bypassed forces along routes, availability of security and survivability forces both en route and at the new locations, as well as status of the defended assets. Each of these criteria is included on the brigade's decision support matrix (DSM) for each movement decision point. Divisional ADA battalions use the brigade's decision point criteria, the Commander's Critical Information Requirements (CCIR), to develop Go/No Go checklists for each Patriot move. Normally, several hours before the scheduled move the divisional ADA battalion commander, or his designated representative in the division main command post, conducts a Go/No Go decision brief. After the division commander approves the movement decision the brigade commander, as the corps commanders representative, decides whether to execute the move or not.

"People, not systems, are the key to integrating and synchronizing ADA combat power in support of the maneuver force. Without properly trained, aggressive officers and NCOs, no amount of technology will enable us to adequately protect the maneuver force."

The ADA rehearsal ensures that all affected units and commanders understand the criteria for each move, the various ADA schemes of maneuver, and how each ADA element: higher, lower, left, and right supports the air defense of the entire corps. The ADA rehearsal ties together all the work done at each level from corps to division ensuring that ADA combat power is fully integrated and synchronized with the maneuver force.

Conclusion

The development and fielding of air defense weapon systems such as Patriot PAC-3, SLAMRAAM and THEL, while important technological advances are not the miracle cure for protecting the maneuver elements of the objective force. The key to supporting the objective force is aggressive, technically and tactically competent air and missile defense officers who have been trained to plan, integrate, and synchronize air defense combat power with corps, division, and future combat elements schemes of maneuver.

We must integrate emerging doctrine such as the various tactics, techniques, and procedures outlined above with the new organizations and weapon systems under development. We must train the next generation of air and missile defense officers to be as comfortable and proficient in a maneuver commander's tactical operations center as they are in a Patriot engagement control station or SHORAD battalion air battle management operations center. People, not systems, are the key to integrating and synchronizing ADA combat power in support of the maneuver force. Without properly trained, aggressive officers and NCOs, no amount of technology will enable us to adequately protect the maneuver force.

Maj. Michael F. Tronolone Jr. is the 108th ADA Brigade assistant operations officer until June 2002 when he becomes the executive officer of the 2nd Battalion, 43rd Air Defense Artillery.

ADA Online

Air Defense Artillery Magazine Online
http://147.71.210.21/adamag
Air Defense Artillery's online professional journal is updated daily.

ADA Mentors
http://147.71.210.21/directory
ADA officers offer counseling and carreer advice.

Stripes
http://147.71.210.21/csm
ADA's top NCO provides commentary on ADA training and soldier issues.

ADA Directory
http://147.71.210.21/directory
Key ADA addresses and phone numbers.

U.S. Army Air Defense Artillery School
http://147.71.210.21
Air Defense Artillery School homepage.

ADA Atlas
http://147.71.210.21/adamag/Atlas/Default.htm
ADA unit location maps hyperlinked to unit web sites.

ADA Recruiting Website
airdefenseartllery.com
ADA carreers for cadets and enlisted recruits.

Office, Chief of ADA
http://147.71.210.21/PPD
Personnel proponent specialists fine-tune ADA force structure and military occupational specialities.

ADA Heroes
http://147.71.210.21/adamag/ADA%20Heroes/Heroes.htm
Air defenders decorated for heroism under fire.

ADA Association
http://www.firsttofire.com/
Air Defense Artillery's professional association and "First to Fire" gift shop.

MDA Link
http://www.acq.osd.mil/bmdo/bmdolink/html/
Homepage of the Missile Defense Agency.

Program Executive Offfice-AMD
http://peoamd.redstone.army.mil

Army Space and Missile Defense Command
http://www.smdc.army.mil/